

New and Little Known Geometrinae and Larentiinae from Korea, with Description of A New Species (Lepidoptera, Geometridae)

Evgeny A. BELJAEV and Sung-Hwan OH¹⁾

Institute of Biology and Soil Sciences, Far Eastern Branch of Russian Academy of Sciences,
690022, Vladivostok, Russia. E-mail: entomol@online.marine.su

¹⁾ Sungbo Chemicals Co., Deockeun-dong, Deockyang-gu, Goyang, Gyunggi Province,
412-170 Korea. E-mail: insecta-shoh@hanmail.net

Abstract A new species, *Maxates sungbokahni* sp. nov. is described and 10 species; *Comibaena diluta* (Warren, 1895), *Comibaena tancrei* Graeser, 1889, *Comibaena subdelicata* Inoue, 1986, *Hemistola nemoriata* (Staudinger, 1897), *Hemistola cinctigutta* Prout, 1935, *Anticollix sparsata* (Treitschke, 1828), *Subphyla discomelaina* (Wehrli, 1931), *Perizoma haasi* (Hedemann, 1881), *Perizoma contritum* (Prout, 1913), and *Perizoma hydratum* (Treitschke, 1829) are reported for the first time from Korea. Distribution of *Thalera lacerataria* Graeser, 1889, in Korea is reconfirmed. New data on the distribution of *Trichoperyx inouei* Hashimoto, *Epilobophora obscuraria* (Leech), and *Xanthorhoe fluctuata malleola* Inoue in Korea are provided.

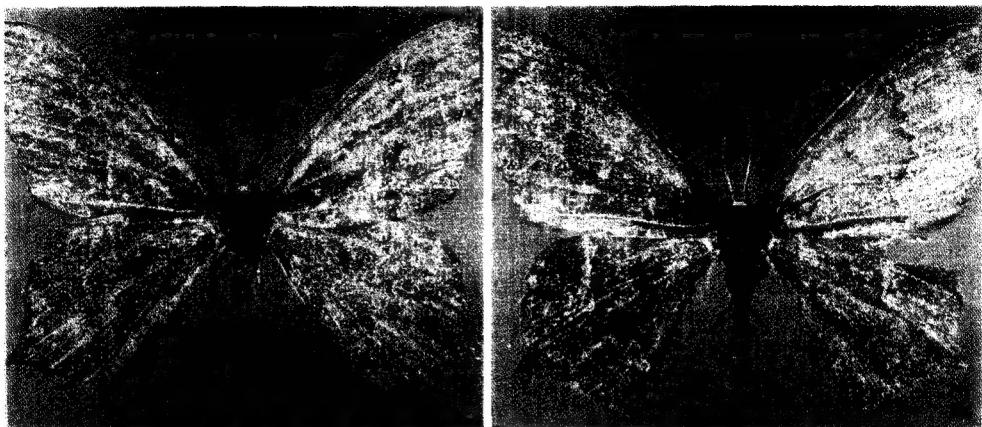
Key words Systematics, Lepidoptera, Geometridae, Korea

INTRODUCTION

This paper includes some new taxonomic and faunistic data on subfamilies Geometrinae and Larentiinae in Korea, base on the study of entomological collections in the Center for Insect Systematics [CIS], Chuncheon, in the Laboratory of Insect Taxonomy, National Institute of Agricultural Science and Technology [NIAST], Suwon, and in the private collection of Dr. S.H. Oh. Types of the newly described species are placed in the collections in CIS and NIAST. Abbreviations used for provinces are: GG- Prov. Gyeonggi; GW- Prov. Gangwon; CN- Prov. Chungnam; JB- Prov. Jeonbuk; JN- Prov. Jeonnam; GN- Prov. Gyeongnam; JJ- Prov. Jeju.

***Maxates sungbokahni* sp. nov.** 성복제비 푸른자나방 (新稱)
(Figs 1-5).

Gelasma grandificaria: Oh, 1987: 34 (part), fig. 35 (nec Graeser, 1890).



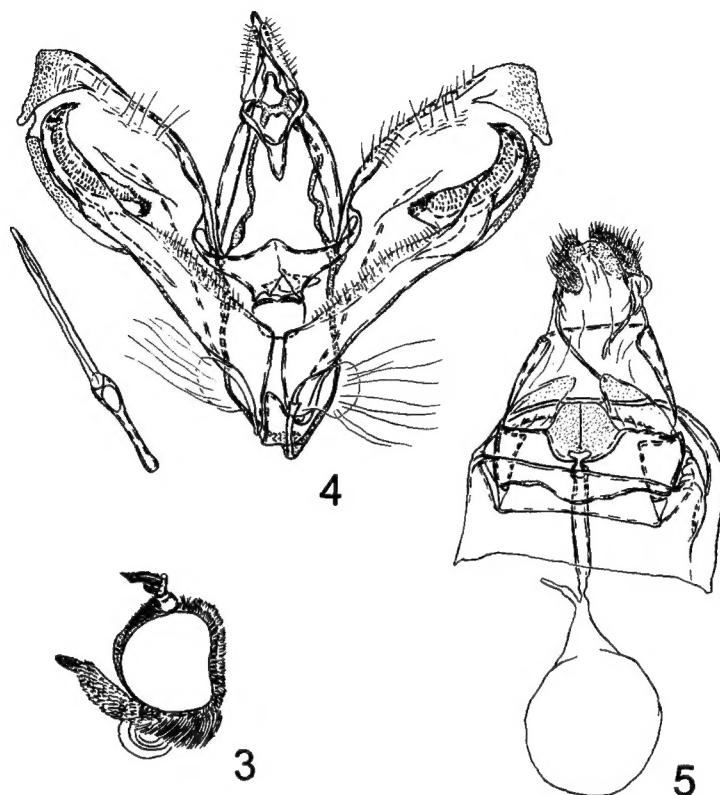
Figs 1-2. Adults of *Maxates sungbokahni* sp. nov.: 1. holotype, ♂; 2. paratype, ♀.

Description. Male (Figs 1, 3). Length of forewing 16–19 mm. Antennae bipectinate, frons covered by blackish scales; vertex with slightly-yellow scales. Labial palpi blackish dorsally and whitish ventrally; 3rd segment long, approximately half of 2nd segment in length. Wings blue greyish-green, with narrow irregularly dentate antemedian (except hindwings) and postmedian transverse lines, and large but weak transversal discal strokes, underside of wings monochromatic pale greyish-green. Outer margin of wings weakly waved, “tails” on hindwings short, triangular; fringe concolourous. Hind tibia fine, without hair pencil. Female (Fig. 2) as male, but some larger (length of forewing 17–20 mm); antennae simple, filiform.

Male genitalia (Fig. 4). Uncus and gnathos simple, moderate in size. Socii simple, elongate, slightly shorter than uncus. Valva elongate, truncate on apex, with knob-like process on the ventro-distal angle of valva; harpe large, strong, hook-shaped distally, dilated basally. Aedeagus simple, very thin.

Female genitalia (Fig. 5). Ovipositor short, papillae small, pillow-like, covered densely with thin hair-like setae. Apophyses anteriores lacking. Lamella antevaginalis very large, shaped as a wide and long transversal band, wider than VIII tergum. Lamella postvaginalis moderate in size, round-hexagonal, some concave, scobinate. Ductus bursae slightly sclerotized, long, narrow, straight. Corpus bursae oval, membranous; signum absent. VII tergum posteriorly with hood-like extension covered anterior part of VIII tergum.

Diagnosis. Superficially the new species is similar to *Maxates illiturata* (Walker, 1863), but it is distinguishable from the latter by the darker wings, more sinuous outer margin of wings, wider base of “tails” on hindwings, and especially by 3rd segment of palpi of the new species about twice as long as those of *Maxates illiturata* (Walker, 1863). In the male genitalia it differs by the narrower shape of harpe, hook-shaped distal apex, and densely setosed on the basal dilation; in the female genitalia it differs by much wider and sclerotized lamella postvaginalis and lamella antevaginalis, the shorter ductus bursae, and lacking of apophyses anteriores. The new species is also closely related to *Maxates grandificaria* (Graeser, 1890): the mark on the wings differs from the latter by less sinuous outer margin of wings, by fringe concolourous fringe; 3rd segment of palpi that is approximately twice as long as those of *Maxates grandificaria* (Graeser, 1890).



Figs 3-5. Head and genitalia of *Maxates sungbokahni* sp. nov.: 3. male, head, lateral view; 4. male genitalia; 5. female genitalia.

Material examined. Holotype. ♂, Gwangneung, GG, Korea, 3 VII 1985 (KJ Won). Paratypes: same locality as holotype, 1 ♂, 4 VII 1972 (SM Lee); 1 ♂, 6 VII 1972 (SM Lee); 3 ♂, 4 VII 1972 (SM Lee); ♂, 4 VII 1973 (SH Oh); 1 ♂, 10 VII 1984 (SH Oh); 1 ♀, 6 VII 1986 (KJ Won); 1 ♀, Suwon, GG, Korea, 1 VII 1921 (Okamoto [abdomen lacking]); 1 ♂, 1 ♀, Aengmubong, GG, Korea, 26 VI 1971 (SM Lee); 1 ♀, Mt. Samak-san, GW, Korea, 19 VII 1989 (KT Park); 1 ♀, Mt. Seolak-san, GW, Korea, 2 VII 1965 (SM Lee). Holotype and paratypes are deposited in NAIST and part of paratypes in CIS.

Distribution. Korea (GG, GW).

Biological notes. The examined specimens were mostly collected in deciduous and pine-deciduous forests in the low and mid mountain belt.

Etymology. The species is named in honour of Dr. Sung Bok Ahn, the untimely deceased Korean scientist-lepidopterologist.

Comibaena diluta (Warren, 1895) 남방푸른자나방 (新稱)

(Fig. 6)

Colutoceras diluta Warren, 1895, Novit. zool. 2: 88.

Material examined. JJ- 1♀, Jeju, 10 X 1975 (HS Kim).

Distribution. Korea (new record- JJ), Japan (Shikoku, Kyushu, Tshushima, Okinawa).

***Comibaena tancrei* (Graeser, 1890) 북방푸른자나방 (新稱)**

(Fig. 7)

Phorodesma tancrei Graeser, 1890, Berl. ent. z. 33(2): 264.

Material examined. GW- 1♀, Mt. Seolak-san, 18 VII 1972 (SH Oh); 1♀, Mt. Gwangdeok-san, 24 VI 1994 (BK Byun).

Distribution. Korea (new record- GW), South of Russian Far East.

***Comibaena subdelicata* Inoue, 1986** 갈색무늬푸른자나방 (新稱)

(Fig. 8)

Comibaena subdelicata Inoue, 1986, Tinea 12: 52, Figs 6c, d; 7c, d.

Material examined. GG- 1♂, Cheongpyeong, 15 VII 1972 (SM Lee); 1♂, Mt. Cheongye-san, 20 VIII 1976 (YY Ha); GW- 1♂, Hongcheon, 25 VI 1989 (KS Lee); 1♀, ditto, 31 VIII 1992 (KT Park & BK Byun); 1♀, ditto, 13 VII 1995 (KT Park & H K Lee); 1♂, ditto, 12 VI 1996 (SH lung & YK Lee); 1♂, Mt. Seolak- san, 29 VI 1973 (SM Lee); 1♂, Chuncheon, 5 VI 1980 (KT Park); 1♂, Hwengseong, 22 VIII 1994 (KK Byun); 2♂, Mt. Bangtae-san, 23 VI 1996 (YM Park & HK Lee); 1♂, ditto, 24 VI 1996 (YM Park & HK Lee); 10♂, ditto, 8 IX 1996 (YM Park & HK Lee); JB- 1♂, Mt. Daedun-san, 22 V 1992 (KT Park); 3♂, Mt. Naebyeon-san, 4-5 VIII 1992 (KT Park & BK Byun).

Distribution. Korea (new record- GG, GW, JB), Japan (Shikoku, Kyushu), Taiwan.

***Hemistola nemoriata* (Staudinger, 1897) 톱무늬연푸른자나방 (新稱)**

(Fig. 9)

Phorodesma (?) nemoriata Staudinger, 1897, Dt. ent. Z. Iris 10: 9.

Hemistola sp.: Oh, 1987: 71, figs. 7, 56.

Material examined. GG- 1♂, Gwangneung, 6 VII 1972 (SM Lee); GW- 1♂, Mt. Seolak-san, 28 VI 1973 (SM Lee); JB- 1♀, Muju, 28 VII 1976 (JD Kim); JN- 1♂, Mt. Jiri-san, 17 VII 1982, (CM Kim).

Distribution. Korea (new record- GG, GW, JB, JN), South of Russian Far East (Primorsk Territory).

***Hemistola cinctigutta* Prout, 1935** 네점박이연푸른자나방 (新稱)

(Fig. 10)

Hemistola cinctigutta Prout, 1935, in Setz, The Macrolepidoptera of the World 4(Suppl.): 20, pl. 3: e.

Hemistola sp.: Oh, 1987: 71, figs 8, 57.

Material examined. GG- 1♂, Cheongpyeong, 15 VI 1972 (SM Lee); 1♂, Gwangneung, 2 VII 1972 (SM Lee); 1♂, ditto, 1 VII 1972 (SM Lee); GW- 1♂, Mt. Gariwang-san, 25 VII 1987 (SS Kim); 1♀,

ditto, 26 VII 1987 (SS Kim).

Distribution. Korea (new record - GG, GW), China (Sichuan).

Remarks. Since the type specimen was known only from Ta-tsien-lu (= Kangding), Prov. Sichuan, China, it is found for the first time from Korea. The examined Korean specimens well agree to the original description of Prout. The male genitalia of this species were illustrated under an unidentified species by Oh (1987).

***Thalera lacerataria* Graeser, 1889 톱날개푸른자나방**

(Fig. 11)

Thalera lacerataria Graeser, 1889, Berl. ent. z. 32 (2): 387.

Chlorodontoptera robustaria: Leech, 1898: 230 (nec Guenée, 1858).

Thalera lacerataria: Inoue, 1946: 24; Shin, 1983a: 182, pl. 2, fig. 28.

Thaleta rubrifimbria: Inoue, 1990: 3; Shin, 1996: 13 (nec Inoue, 1990).

Material examined. GG- 1♀, Gwangneung, 7 VIII 1985 (KJ Won); 1♀, Mt. Myoungji-san, 28 VII 1992 (KT Park & BK Byun); GW- 1♀, Mt. Seolak-san, 29 VII 1973 (SH Oh); 1♀, ditto, 31 VII 1973 (SM Lee); 1♀, ditto, 10 VIII 1989 (KT Park), 1♀, ditto, 14 VIII 1974 (coll. unknown); 1♂, Mt. Odae-san, 8 VIII 1989 (KJ Won); JJ- 1♀, Temp. Gwaneumsa, 24 VIII 1992 (KT Park & BK Byun).

Distribution. Korea (GG, GW, JJ), South of Russian Far East, China.

Remarks. Inoue (1990) referred the occurrence of *Thalera rubrifimbria* Inoue in the Korea, based on the illustration of the *Thalera lacerataria* Graeser in Shin (1983, pl. 2, fig. 28). We had no opportunity to examine the illustrated specimen, but we suppose that all examined specimens from Korea belonging to this species probably are *Thalera lacerataria* Graeser, because they are very similar each other. Thus, *Thalera rubrifimbria* Inoue, is not found in Korea yet.

***Trichopteryx inouei* Hashimoto, 1987 남방잔날개풀결자나방**

(Fig. 12)

Trichopteryx inouei Hashimoto, 1987, Tinea (Suppl.) 12: 232, 233, 235, 236, ,figs 3, 5-14, 24-27.

Material examined. GW- 1♂, Yangyang, 15 V 1987 (KT Park); 1♂, Chuncheon, 3 V 1995 (HK Lee).

Distribution. Korea (GW, JJ).

Remarks. The species was noted from continental part of Korea for the first time.

***Epilobophora obscuraria* (Leech, 1891) 뒷검은풀결자나방**

(Fig. 13)

Lobophora obscuraria Leech, 1891, Entomologist 24 (Suppl.): 55.

Nothopterix obscuraria: Maruta, 1929: 348.

Material examined. GN- 1♀, Is. Namhae-do, 2 VI 1994 (BK Byun).

Distribution. Korea (GG, GN), Japan (Honshu, Shikoku, Kyushu), East and Central China.

Remarks. Since Maruta (1929) reported this species from Suwon, no additional data have been represented on this species in Korea.

***Anticollix sparsata* (Treitschke, 1828)** 물결날개물결자나방 (新稱)
(Fig. 14)

Larentia sparsata Treitschke, 1828, Schmett. Eur. 6 (2): 133.

Material examined. GG- 1♀, Suweon, 23 VI 1976 (KY Choe).

Distribution. Korea (new record- GG), Japan (Hokkaido, Honshu), South of Russian Far East (Amursk Region, South of Khabarovsk Territory, Primorsk Territory, Sakhalin Island), South Siberia (Sayan Mountains, Altai), Urals, Europe.

***Euphyia discomelaina* (Wehrli, 1931)** 넉점갈색물결자나방 (新稱)
(Fig. 15)

Cidaria (Euphyia) discomelaina Wehrli, 1931, Mitt. dt. ent. Ges. 2 (7): 108.

Material examined. GG- 1♀, Gwangneung, 10 VII 1982 (CH Ryu); GW- 1♀, Mt. Seolak-san, 2 VII 1969 (SM Lee); CN- Mt. Weolak-san, 14 VI 1984 (SB Ahn).

Distribution. Korea (new record- GG, GW, CN), China (Beijing).

Remarks. This species is associated with genus *Euphyia* Hübner, 1816 (type-species *Geometra picaria* Hübner, 1813), but the examination of the females is insufficient for clearing its systematic position.

***Perizoma haasi* (Hedemann, 1881)** 톱무늬검띠물결자나방 (新稱)
(Fig. 16)

Cidaria haasi Hedemann, 1881, Horae Soc. ent. Ross. 16: 268, pl. 13: 9.

Material examined. GW- 1♀, Mt. Seolak-san, 6 VI 1969 (SM Lee).

Distribution. Korea (new record- GW), Japan (Honshu, S. Alps), Russian Far East (Kamchatka Peninsula, Amursk Province, North of the Primorsk Territory, South Kuril Islands).

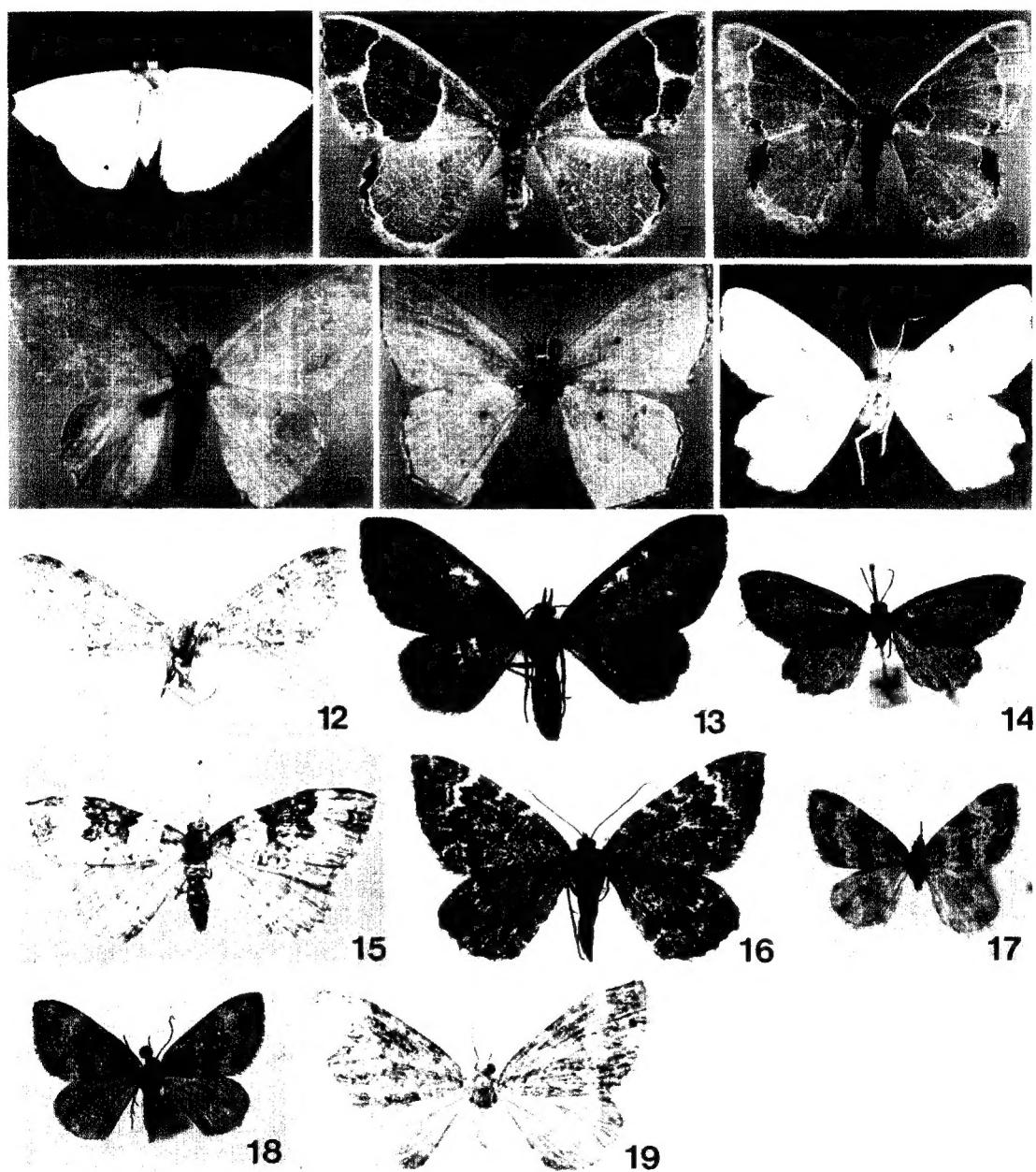
***Perizoma contritum* (Prout, 1913)** 산검띠물결자나방 (新稱)
(Fig. 17)

Cidaria (Perizoma) contrita Prout, 1913, in Seitz, The Macrolepidoptera of the World 4: 261.

Perizoma illepida Inoue, 1955, Tinea 2 (1/2): 80, pl. 6: 10.

Material examined. GW- 1♀, Mt. Odae-san, 11 IX 1976 (JC Paik); 2♂, 1♀, ditto, 12 IX 1976 (KT Park); 3♀, ditto, 12 IX 1976 (JC Paik); 3♀, ditto, 12 IX 1976 (JS So); 2♀, ditto, 12 IX 1976 (KB Uhm); 1♀, Mt. Jeombong-san, 22 VI 1992 (KT Park).

Distribution. Korea (new record- GW), Japan (Honshu, Central Mountains), South of Russian Far East (Amursk Region, South of Khabarovsk Territory, Primorsk Territory), South Siberia (Transbaicalia, Sayan



Figs 6-19. Adults: 6. *Comibaena diluta* (Warren, 1895), ♀; 7. *Comibaena tancrei* (Graeser, 1890), ♀; 8. *Comibaena subdelicata* Inoue, 1986, ♂; 9. *Hemistola nemoriata* (Staudinger, 1897), ♂; 10. *Hemistola cinctigutta* Prout, 1935, ♂; 11. *Thaleracacerataria* Graeser, 1889, ♂; 12. *Trichoperyx inouei* Hashimoto, 1987, ♂; 13. *Epilobophora obscuraria* (Leech, 1891), ♀; 14. *Anticollix sparsata* (Treitschke, 1828), ♀; 15. *Euphyia discomelaina* (Wehrli, 1931), ♀; 16. *Perizoma haasi* (Hedemann, 1881), ♀; 17. *Perizoma contritum* (Prout, 1913), ♀; 18. *Perizoma hydratum* (Treitschke, 1829), ♂; 19. *Xanthorhoe fluctuata malleola* Inoue, 1955, ♀.

Mountains).

***Perizoma hydratum* (Treitschke, 1829) 큰검띠물결자나방 (新稱)**

(Fig. 18)

Acidalia hydratum Treitschke, 1829, Schmett. Eur. 7: 217.

Material examined. GW- 1♂, Mt. Gyebang-san, 2 VIII 1989 (KT Park).

Distribution. Korea (new record- GW), South Siberia (Transbaicalia, Sayan Mountains, Altai), North Mongolia, Urals, Caucasus, Transcaucasus(Georgia), Europe.

***Xanthorhoe fluctuata malleola* Inoue, 1955** 검정무늬 산물결자나방

(Fig. 19)

Xanthorhoe fluctuata malleola Inoue, 1955, Tinea 2(1/2): 77.

Dysstroma (Diploctena?) fluctuata: Bryk, 1949: 181.

Xanthorhoe fluctuata: Xanthorhoë, 1983: 997.

Xanthorhoe fluctuata: Shin, 1996: 36.

Material examined. North Korea- 1♀, Shuotsu [Jueul], 25 VIII 1935 (Sten Bergman); GW- 1♂, Hongcheon, 18 VI 1994 (BK Byun); 1♀, Chugok-ri, Chuncheon, 2 IX 1996 (HK Lee & JS Lee).

Distribution. Korea (North Korea, GW), Japan (Honshu, Japan Alps), Russian Far East (Kamchatka Peninsula, Kuril Islands: Simushir Isl.), South Siberia, Yakutia, Middle Asia, North Iran, Transcaucasia, Caucasus, Syria, Asia Minor, Europe, North Africa.

Remarks. After Bryk (1949) reported this species from North Korea, it is noted second time for Korea and firstly known from its southern part. The examined Korean specimens differ from North European ones; habitually in smaller size and darker coloration, especially of hindwing, and having markedly shorter uncus and distal part of valva in the male, and shorter ductus bursae and some less numerous and some shorter spines of signum in the female. We consider that the Korean population is more associated with Japanese subspecies *X. fluctuata malleola* Inoue.

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REFERENCES

- Bryk, F. 1949. Zur Kenntnis der Grosschmetterlinge von Korea. Pars II. *Ark. for Zool.* 41A (1): 1-217.
- Inoue, H. 1946. A catalogue of the Geometridae of Corea. *Bull. Iep. Soc. Jap.* 1 (2): 19-59.
- Inoue, H. 1990. A new species of the Geometrinae from Japan (Lepidoptera: Geometridae). *Akitu* (N. Ser.) 116: 1-4.
- Maruta, S.T. 1929. The survey of nocturnal flying insects. *Ann. Agr. Exp. Sta. Gov. Gen Chosen.* 4 (2): 313-375 (in Japanese).
- Oh, S.H. 1987. *Taxonomic study on the subfamily Geometrinae in Korea (Lepidoptera, Geometridae)*. Thesis for the Degree of Master. Graduate School, Kangwon National University. 88 pp.
- Shin, Y.H. 1983. Geometridae In Shin Y H., K. T. Park & S. H. Nam. *Illustrated Flora & Fauna of Korea* 27 (Insecta 10): 163-273, 760-821, 994-1002, pls 1-14, figs 6-208 (in Korean and English).
- Shin, Y.H. 1996. *Synonymic List and Distribution of the Geometridae of Korea (Lepidoptera)*. pp. 1-153. Insecta Koreana /CIS. Chuncheon, Korea.

**韓國產 푸른자나방亞科와 물결자나방亞科 (나비目, 자나방科)의
韓國未記錄種과 새로운 採集地 追加 보고 및 1新種 기재**

Evgeny A. Beljaev · 吳 星 煥¹⁾

러시아과학원극동분소 생물토양연구소 RF-690022 블라디보스톡, 러시아
 1)成保化學株式會社

국내에 소장되어 있는 韓國產 푸른자나방亞科와 물결자나방亞科의 표본들을 조사한 결과 1新種 *Maxates sungbokahni* sp. nov.를 기재하고, 10未記錄種 *Comibaena diluta* (Warren), *Comibaena tancrei* Graeser, *Comibaena subdelicata* Inoue, *Hemistola nemoriata* (Staudinger), *Hemistola cinctigutta* Prout, *Anticollix sparsata* (Treitschke), *Euphyia discomelaina* (Wehrli), *Perizoma haasi* (Hedemann), *Perizoma contritum* (Prout), *Perizoma hydratum* (Treitschke)을 발표한다. 그리고 分布가 混同되고 있던 *Thalera lacerataria* Graeser의 國內分布를 再確認하고, *Trichoperyx inouei* Hashimoto와 *Epilobophora obscuraria* (Leech), *Xanthorhoe fluctuata malleola* Inoue의 採集記錄을 追加하였다.

검색어 : 나비목, 자나방과, 푸른자나방아과, 물결자나방아과, 분류, 신종, 한국

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